

REMARKS

The claims have been amended to state that the hydrocarbon is partially oxidized when it is activated (this is based on page 10, line 9 of the PCT text). Clearly, for oxidation to take place during prolonged use of the reactor, there must be a source of oxygen. Thus, the hydrocarbon would typically be mixed with air or oxygen or would be an oxygenated hydrocarbon such as an alcohol. This is implicit in the application as a whole.

New claim 28 is similar to previously presented claim 21.

In the Final rejection in the related parent application, the Examiner objected that the invention lacked inventive step in view of Hoard (US 5,746,984) and Kong (US 5,427,747).

Hoard does disclose a plasma reactor comprising a first gas permeable material through which exhaust gases pass, and it implies that the exhaust gas may contain hydrocarbon. However, Hoard does not (as asserted by the examiner) disclose the use of a second gas permeable material to catalyze the reduction of nitrogen oxides to nitrogen. In his arguments, the Examiner has referred to a gas permeable body (3) as being the catalyst. This appears to be wrong as the item (3) is merely the storage device in Figures 1, 2 and 3 (and does not appear in any other figures). This is an important omission as a catalyst can be included in such a system for a variety of purposes. Thus, different types of catalyst would be used depending on whether the catalyst was required to aid hydrocarbon combustion, particulate oxidation or nitrogen oxide reduction.

The present invention uses a catalyst for reducing nitrogenous oxides to nitrogen. In contrast, Hoard implies that a plasma is used instead of a catalyst in column 2, particularly lines 15 to 19 and 38 to 45.

The Examiner is further arguing that although Hoard does not teach that the first gas permeable body activates the gaseous hydrocarbons, this is taught by Kong and one skilled in the art would combine the teaching of Kong with that of Hoard.

In the first place, applicants respectfully submit that one of ordinary skill in the art would not turn to Kong except with prior knowledge of the invention and the choice of this piece of prior art has been made with hindsight. Further, Kong is concerned with the activation of hydrocarbons for reaction in a solid state electrochemical cell so one skilled in the art would not necessarily consult Kong in order to improve the exhaust gas treatment of Hoard as Kong is in a different technical area.

Finally, Kong does not teach activation of hydrocarbons so as to achieve partial oxidation of the hydrocarbons. Kong discloses clearly that the plasma reactor disclosed in Kong is used to produce hydrocarbon radicals (column 2, lines 13 to 15.) These radicals are then fed into the anode of an electrochemical cell and are combined with oxygen that is supplied to the cathode of the cell so as to produce oxygenated hydrocarbon radicals.

The present invention requires that the hydrocarbon gas is activated in the plasma so that it becomes partially oxygenated and this does not occur in Kong. Thus, one skilled in the art would not combine the plasma reactor of Kong with that of Hoard in order to produce partially oxygenated hydrocarbon radicals. If one of ordinary skill in the art were to combine Kong with Hoard, they would use the entire reactor disclosed in Kong complete with the electrochemical cell in order to produce oxygenated hydrocarbon radicals. Thus, it can be seen that the present invention is not the result of a combination of Kong and Hoard. Accordingly, the present invention possesses an inventive step with respect to Hoard in view of Kong.

The examiner also cited Yonemura (US 5,194,078) against claims 6, 9, 23, and 26. These claims are novel and inventive by virtue of their dependence on claims 1 and 16 which are themselves novel and inventive.